

1.0 Introduction

This section presents the calculation of risk-based preliminary remediation goals in sediment and biota. Risk-based PRGs were calculated for all contaminants that posed an excess lifetime cancer risk greater than 1×10^{-6} or a hazard quotient greater than 1 in the final Portland Harbor Baseline Human Health Risk Assessment (Kennedy-Jenks 2013) assuming reasonable maximum exposure.

1.1 Risk-Based PRGs for Fish/Shellfish Tissue

Risk-based preliminary remediation goals (PRGs) are calculated for fish/shellfish tissue and for sediment. Tissue concentrations were calculated as they represent a direct exposure point for human receptors, and because target tissue concentrations are needed to derive sediment concentrations using either sediment-tissue relationships – as either a biota-sediment accumulation regression relationship (BSAR) or biota-sediment accumulation factor (BSAF), or the Arnot and Gobas Food Web Model as refined for Portland Harbor (Windward, 2009).

1.1.1 Risk-Based Tissue PRGs for Direct Consumption

Risk-based tissue PRGs associated with consumption of fish and shellfish were calculated for resident fish using the following equations, adapted from Section 3.5.5 of the Final BHHRA (Kennedy/Jenks, 2013):

Non-cancer effects:

$$PRG_{tissue} = \frac{THQ \times BW \times AT}{ED \times EF \times \frac{1}{RfD} \times CR \times 0.001 \text{ kg / g}}$$

Carcinogenic effects:

$$PRG_{tissue} = \frac{TR \times BW_c \times AT_{nc}}{ED \times EF \times CSF \times CR \times 0.001 \text{ kg/g}}$$

Combined child and adult exposure was evaluated consistent with the following equation:

$$PRG_{tissue} = \frac{TR \times AT}{EF \times CR_{adj} \times CSF \times 0.001 \text{ kg / g}}$$

where:

$$CR_{f-adj} = \frac{ED_c \times CR_c}{BW_c} + \frac{ED_a \times CR_a}{BW_a}$$

and:

PRG _{tissue}	=	risk-based concentration in fish/shellfish tissue (µg/kg, wet-weight)
CR _c	=	consumption rate of fish/shellfish – child (g/day, wet-weight)
CR _a	=	consumption rate of fish/shellfish – adult (g/day, wet-weight)
CR _{f-adj}	=	consumption rate of fish/shellfish – age adjusted (g/day – wet weight)
EF	=	exposure frequency (days/year)
ED _c	=	exposure duration – child (years)
ED _a	=	exposure duration – adult (years)
BW _c	=	body weight – child (kg)
BW _a	=	body weight – adult (kg)
AT	=	averaging time (days)
CSF	=	cancer slope factor (mg/kg-day) ⁻¹
RfD	=	reference dose (mg/kg-day)
THQ	=	target hazard quotient
TR	=	target excess cancer risk

The exposure assumptions used to estimate exposure from fish and shellfish consumption are presented in Table 2.

1.1.2 Risk-Based Tissue PRGs due to Infant Consumption of Breast Milk

Risk-based PRGs in fish and shellfish tissue were calculated using the following equation adapted from Section 3.5.6 of the Final Portland Harbor BHHRA and using a steady-state model that assumes that maternal intake occurs over a period greater than the biological half-life of the contaminant in the body:

$$PRG_{tissue} (\mu g/kg) = \frac{\left(\frac{THQ \times BW_{inf} \times AT_{inf} \times RfD}{f_{mbm} \times CR_{milk} \times ED_{inf}} \right) \times [\ln(2) \times f_{fm}] \times BW_a \times AT_m}{(h \times f_f) \times EF_a \times ED_a \times 10^{-3} kg / g \times 10^{-3} mg / \mu g \times AE \times CR_{fish}}$$

where:

PRG _{tissue}	=	risk-based PRG in fish/shellfish (µg/kg – wet weight)
THQ	=	target hazard quotient
RfD	=	reference dose (mg/kg-day)
AE	=	absorption efficiency of the chemical
h	=	biological half-life of chemical in the body BS(days)
f _f	=	fraction of absorbed chemical stored in fat
f _{fm}	=	fraction of mother's weight that is fat
f _{mbm}	=	fraction of fat in breast milk
CR _{milk}	=	infant consumption rate of breast milk (kg/day)
CR	=	maternal consumption rate of fish (g/day)
ED _{inf}	=	exposure duration of breastfeeding infant (days)

EF _a	= exposure frequency – adult (maternal exposure, days/yr)
ED _a	= exposure duration – adult (days)
BW _{inf}	= average infant body weight (kg)
BW _a	= body weight – adult (maternal body weight, kg)
AT _{inf}	= averaging time – infant exposure (days)
AT _m	= averaging time – maternal exposure (days)

1.1.3 Incidental Ingestion of Sediment

Risk-based PRGs associated with the incidental ingestion of sediment were calculated using the following equations adapted from Section 3.5.1 of the Final BHHRA:

Noncancer effects:

$$Conc_{sed} = \frac{THQ \times BW \times AT}{EF \times ED \times \frac{1}{RfD} \times IRS \times 10^{-6} \text{ kg / mg}}$$

Carcinogenic effects:

$$PRG_{sed} = \frac{TR \times BW \times AT}{EF \times ED \times CSF \times IRS \times 10^{-6} \text{ kg / mg}}$$

Risk-based PRGs based on carcinogenic effects, and where exposure was assumed to occur from childhood through adult years were age-weighted using the following equation:

$$PRG_{sed} = \frac{TR \times AT_c}{CSF \times EF \times IFS_{adj} \times 10^{-6} \text{ kg / mg}}$$

where:

$$IFS_{adj} = \frac{ED_c \times IRS_c}{BW_c} + \frac{ED_a \times IRS_a}{BW_a}$$

and:

PRG _{sed}	= risk-based PRG in soil or sediment (µg/kg or mg/kg)
IFS _{adj}	= age-adjusted soil/sediment incidental ingestion factor [(mg-year)/(kg-day)]
IRS _a	= incidental sediment ingestion rate-adults (mg/day)
IRS _c	= incidental sediment ingestion rate-children (mg/day)
EF	= exposure frequency (days/year)
ED _a	= exposure duration – adult (years)
ED _c	= exposure duration – child (years)

BW_a = body weight – adult (kg)
 BW_c = body weight – child (kg)
 AT = averaging time (days)
 THQ = target hazard quotient
 TR = target excess cancer risk
 CSF = cancer slope factor (mg/kg-day)⁻¹

The following equation was used to calculate risk-based PRGs in sediment for contaminants known to be mutagenic (cPAHs), and incorporates the potency adjustments of 10 and 3, respectively, for exposures occurring before 2 years of age and from ages 2 through 16:

$$PRG_{sed} = \frac{TR \times AT}{EF \times CSF \times ISIFM_{adj} \times 10^{-6} \text{ kg / mg}}$$

$$ISIFM_{adj} = \left(\frac{(ED_{0-2} \times IRS_c) \times 10}{BW_c} + \frac{(ED_{2-6} \times IRS_c) \times 3}{BW_c} + \frac{(ED_{6-16} \times IRS_a) \times 3}{BW_a} + \frac{(ED_{16-30} \times IRS_a) \times 1}{BW_a} \right)$$

where:

PRG_{sed} = chemical concentration in soil or sediment (mg/kg)
 IRS_a = adult soil/sediment ingestion rate (mg/day)
 IRS_c = child soil/sediment ingestion rate (mg/day)
 ISIFM_{adj} = incidental sediment ingestion factor for mutagens (mg-yr/kg-day)
 EF = exposure frequency (days/year)
 ED₀₋₂ = exposure duration ages 0-2 (years)
 ED₂₋₆ = exposure duration ages 2-6 (years)
 ED₆₋₁₆ = exposure duration ages 6-16 (years)
 ED₁₆₋₃₀ = exposure duration ages 16-30 (years)
 BW_a = adult body weight (kg)
 BW_c = child body weight (kg)
 AT = averaging time (days)
 CSF = cancer slope factor (mg/kg-day)⁻¹
 RfD = reference dose (mg/kg-day)
 THQ = target hazard quotient
 TR = target excess cancer risk

The exposure assumptions are provided in Table 2.

1.1.4 Dermal Contact with Sediment

Risk-based PRGs for dermal contact with sediment were calculated using the following equations adapted from Section 3.5.2 of the Final BHHRA:

Non-cancer effects:

$$PRG_{sed} = \frac{THQ \times AT \times BW}{EF \times ED \times \frac{1}{RfD} \times SA \times AF \times ABS \times 10^{-6} \text{ kg / mg}}$$

Cancer effects:

$$PRG_{sed} = \frac{TR \times AT_c \times BW}{EF \times ED \times CSF \times SA \times AF \times ABS \times 10^{-6} \text{ kg / mg}}$$

Combined child and adult age-weighted exposures resulting from dermal contact with contaminants in sediment for the recreational beach user exposure scenarios were calculated consistent with the following equations:

$$PRG_{sed} = \frac{TR \times AT_c}{CSF \times EF \times IFS_{adj} \times 10^{-6} \text{ kg / mg}}$$

where:

$$DFS_{adj} = \frac{ED_c \times EF_c \times AF_c \times SA_c}{BW_c} + \frac{ED_a \times EF_a \times AF_a \times SA_a}{BW_a}$$

and:

PRG _{sed}	= concentration in soil or sediment (µg/kg or mg/kg)
DFS _{adj}	= age-adjusted dermal contact factor [(mg-year)/(kg-day)]
ABS _{dermal}	= dermal absorption efficiency (0.13)
SA _a	= exposed skin surface area – adult (square centimeters [cm ²])
SA _c	= exposed skin surface area – child (cm ²)
AF _a	= soil-to-skin adherence factor – adult (mg/cm ²)
AF _c	= soil-to-skin adherence factor – child (mg/cm ²)
EF	= exposure frequency (days/year)
ED _a	= exposure duration – adult (years)
ED _c	= exposure duration – child (years)
BW _a	= body weight – adult (kg)
BW _c	= body weight –child (kg)
AT	= averaging time (days)
CSF	= cancer slope factor (mg/kg-day) ⁻¹
RfD	= reference dose (mg/kg-day)
THQ	= target hazard quotient
TR	= target excess cancer risk

Risk-based PRGs for cPAHs based on dermal exposure to sediments were also calculated as using the early-life exposure adjustments described in Section 1.1.3:

$$PRG_{sed} = \frac{TR \times AT}{EF \times CSF \times DSCFM_{adj} \times ABS \times CF}$$

Where:

$$DSCFM_{adj} = \left(\frac{ED_{0-2} \times AF_c \times SA_c \times 10}{BW_c} + \frac{ED_{2-6} \times AF_c \times SA_c \times 3}{BW_c} + \frac{ED_{6-16} \times AF_a \times SA_a \times 3}{BW_a} + \frac{(ED_{16-30} \times AF_a \times SA_a \times 1)}{BW_a} \right)$$

where:

- PRG_{sed} = chemical concentration in soil or sediment (mg/kg)
- ABS_{dermal} = dermal absorption efficiency
- DSCFM_{adj} = dermal sediment contact factor for mutagens (mg-yr/kg-day)
- SA_a = adult exposed skin surface area (square centimeters [cm²])
- SA_c = child exposed skin surface area (cm²)
- AF_a = adult soil-to-skin adherence factor (mg/cm²)
- AF_c = child soil-to-skin adherence factor (mg/cm²)
- EF = exposure frequency (days/year)
- ED₀₋₂ = exposure duration ages 0-2 (years)
- ED₂₋₆ = exposure duration ages 2-6 (years)
- ED₆₋₁₆ = exposure duration ages 6-16 (years)
- ED₁₆₋₃₀ = exposure duration ages 16-30 (years)
- BW_a = adult body weight (kg)
- BW_c = child body weight (kg)
- AT = averaging time (days)
- TR = target excess cancer risk

Exposure assumptions are presented in Tables 3-21 and 3-22 of the Final BHHRA.

The individual pathway-specific calculations are combined to a total risk-based PRG in sediment using the following equation:

$$PRG_{sed} = \frac{1}{\frac{1}{Conc_{sed} - Ingestion} + \frac{1}{Conc_{sed} - dermal}}$$

1.1.5 Calculation of Sediment Risk-Based PRGs for Fish/Shellfish Consumption

Target tissue concentrations were calculated using the method described in Section 1.1.1. To calculate sediment PRGs for scenarios where fish consumption is primarily the fillet, it was necessary to determine the relationship between whole body and fillet-only concentrations, because both the BSAFs/BSARs and the FWM are based on whole body

concentrations. The whole-body/fillet concentration ratios were calculated using the measured mean whole body and fillet concentrations of each COC on a river mile or fishing zone basis, and are presented in Table 4.

cPAHs

The Bioaccumulation Modeling Report (Windward, 2009) presented a calculated BSAR for benzo(a)pyrene in field clams as the following equation:

$$\ln(PRG_{sed}) = \frac{\ln(C_{tissue}) - \ln(CF) + 2.47}{0.60}$$

In order to calculate a PRG, the BSAR for benzo(a)pyrene was considered representative of total carcinogenic PAHs. Because the BSAR is based on lipid-normalized tissue and organic carbon normalized, corrections for site organic carbon and the lipid content of clams were incorporated to arrive at a dry-weight sediment concentration:

$$\ln(PRG_{sed}) = \left[\frac{(\ln(C_{tissue}) - \ln(f_{lipid})) - \ln(CF) + 2.47}{0.60} \right] + \ln(f_{oc})$$

And:

$$PRG_{sed} = e^{\left[\frac{(\ln(C_{tissue}) - \ln(f_{lipid})) - \ln(CF) + 2.47}{0.60} \right] + \ln(f_{oc})}$$

- PRG_{sed} = risk-based PRG in sediment (µg/kg)
- C_{tissue} = risk-based target fish/shellfish tissue concentration – wet weight (µg/kg)
- CF = correction factor (2.31, see Table 4-1, Windward 2009)
- f_{oc} = fraction organic carbon site sediments (0.0171)
- f_{lipid} = fraction of lipid in clam tissue (0.22)

Hexachlorobenzene

Sediment-tissue BSAFs for hexachlorobenzene were developed for large home-range species, no relationship was established for smallmouth bass (Windward, 2009). The general relationship between sediment and tissue concentrations is expressed by the following equation:

$$PRG_{sed} = \frac{C_{tissue}}{BSAF}$$

Correcting for the organic carbon content of sediment and lipid content of fish gives the following equation:

$$PRG_{sed} = \frac{\left[\left(\frac{C_{tissue}}{f_{lipid}} \right) \times f_{oc} \right]}{BSAF}$$

where:

PRG_{sed} = concentration in sediment (µg/kg)
 f_{lipid} = lipid content of fish (percent)
 f_{oc} = sediment organic carbon content (0.0171)
 $BSAF$ = biota-sediment accumulation factor (unitless)

	BSAF	Lipid Content (percent)
Black Crappie	2.02	5.2
Brown Bullhead	0.295	2.4
Carp	0.244	8.8

As noted above, BSAFs were only developed for large home-range species, and not for smallmouth bass. Accordingly, target sediment concentrations were calculated for each species, and the risk-based sediment PRG for hexachlorobenzene was calculated using the following equation:

$$PRG_{sed} = \frac{1}{\frac{1}{Conc_{sed} - Crappie} + \frac{1}{Conc_{sed} - Carp} + \frac{1}{conc_{sed} - Bullhead}}$$

PRGs calculated using the Food-Web Model

The Arnot and Gobas food-web model (Windward, 2009) was refined for Portland Harbor, and accounts for uptake of contaminants via direct incidental ingestion, dietary uptake, and uptake of dissolved contaminants via ingestion and gill uptake. The FWM was calibrated for chlorinated persistent organic contaminants (aldrin, dieldrin, chlordane, DDx, PCBs, and dioxins/furans). Although the final BHHRA evaluated consumption of smallmouth bass, carp, brown bullhead, and crappie, the latter two species are not evaluated in the FWM. However, largescale sucker were used as a surrogate for bullhead, and sculpin as a surrogate for crappie, as they were considered representative of the same trophic group (Windward, 2009). In addition, the FWM as calibrated for 2,3,4,7,8-pentachlorodibenzo furan was assumed to be representative of total dioxins/furans. Oregon human health ambient water quality criteria for consumption of water and organism were used as input for dissolved water concentration (DEQ, 2011).

The calculated whole body concentrations were converted to fillet concentrations using the whole-body/fillet ratios presented in Table 4. The resulting fillet concentration for each of the four species were further combined as a weighted mean, with each species

representing 25 percent of the total diet. The goal-seek function in Excel was then used to iteratively calculate an average sediment concentration that resulted in the averaged tissue concentration of the four modeled species.

1.1.6 REFERENCES

Kennedy/Jenks Consultants. 2013. Portland Harbor RI/FS, Final Remedial Investigation Report, Appendix F, Baseline Human Health Risk Assessment. Portland, OR. April 2013.

Oregon Department of Environmental Quality (ODEQ), 2011. Water Quality Standards for Toxic Pollutants, Table 40. OAR 340-041-0033

Windward. 2009. Portland Harbor RI/FS Bioaccumulation Modeling Report. Draft. WE-09-0003. Prepared for the Lower Willamette Group, Portland, OR. Windward Environmental LLC, Seattle, WA. July 21, 2009.

Table 1
Risk-Based Preliminary Remediation Goals In Tissue

	PRGs (µg/kg fish tissue) Consumption Rate = 142 g/day				
	Cancer	Noncancer	Infant	PRG	Basis ^a
Arsenic	6.7.E-01	7.9.E+01		6.7.E-01	ca
Aldrin	5.9.E-02	7.9.E+00		5.9.E-02	ca
Dieldrin	6.3.E-02	1.3.E+01		6.3.E-02	ca
Chlordane	2.9.E+00	1.3.E+02		2.9.E+00	ca
DDx	3.0.E+00	1.3.E+02	9.4E+01	3.0.E+00	ca
Hexachlorobenzene	6.3.E-01	2.1.E+02		6.3.E-01	ca
cPAHs	4.6.E-02	7.9.E+01			ca
PCBs	5.0.E-01	5.2.E+00	2.7E-01	2.7.E-01	infant
TCDD	7.7.E-06	1.8.E-04	6.2E-06	6.2.E-06	infant
PDBEs		2.6.E+01	8.9E-01	8.9.E-01	infant

a – ca = cancer endpoint, infant = infant consumption of breastmilk

Table 2: Specific Exposure Values

Symbol	Description	Subsistence Fisher	Tribal Fisher	Recreational Beach Use	Dockside Worker	In-Water Worker	Infant Consumption of Breast milk
ABS _{dermal}	absorption efficiency	See Table 3	See Table 3	See Table 3	See Table 3	See Table 3	--
ABS	absorption efficiency (mg-yr/kg-day)	See Table 3	See Table 3	See Table 3	See Table 3	See Table 3	--
AE	oral absorption efficiency of the chemical	--	--	--	--	--	1
AF _a	soil-to-skin adherence factor – adult (mg/cm ²)	0.3	0.3	0.3	0.2	0.2	--
AF _c	soil-to-skin adherence factor – child (mg/cm ²)	--	--	3.3	--	--	--
AT _c	averaging time – carcinogenic exposures (days)	25,550	25,550	25,550	25,550	25,550	--
AT _{inf}	averaging time – infant exposure (days)	--	--	--	--	--	365
AT _m	averaging time – maternal exposure (days)	--	--	--	--	--	--
BW _a	body weight – adult (kg)	70	--	70	70	70	70
BW _a	body weight – adult (maternal body weight, kg)	--	--	--	--	--	--
BW _c	body weight – child (kg)	15	--	15	--	--	--
BW _{inf}	average infant body weight (kg)	--	--	--	--	--	7.8
CR	maternal consumption rate of fish (g/day)	--	--	--	--	--	142
CR _a	consumption rate of fish/shellfish – adult (g/day, wet-weight)	142/3.3	--	--	--	--	--
CR _c	consumption rate of fish/shellfish – child (g/day, wet-weight)	60/--	--	--	--	--	--
CR _{milk}	infant consumption rate of breast milk (kg/day)	--	--	--	--	--	0.98
CSF	cancer slope factor (mg/kg-day) ⁻¹	See Table 3	See Table 3	See Table 3	See Table 3	See Table 3	--
ED ₀₋₂	exposure duration ages 0-2 (years)	--	--	2	--	--	--
ED ₁₆₋₃₀	exposure duration ages 16-30 (years)	--	--	14	--	--	--
ED ₂₋₆	exposure duration ages 2-6 (years)	--	--	4	--	--	--
ED ₆₋₁₆	exposure duration ages 6-16 (years)	--	--	10	--	--	--
ED _a	exposure duration – adult (years)	30	70	30	25	10	--
ED _c	exposure duration – child (years)	6	--	6	--	--	--
ED _{inf}	exposure duration of breastfeeding infant (days)	--	--	--	--	--	365
EF	exposure frequency (days/year)	350/156 ^a	260	94	50	10	--
EF _a	exposure frequency – adult (maternal exposure, days/yr)	--	--	--	--	--	350
f _f	fraction of absorbed chemical stored in fat	--	--	--	--	--	0.9
f _{fm}	fraction of mother's weight that is fat	--	--	--	--	--	0.3
f _{mbm}	fraction of fat in breast milk	--	--	--	--	--	0.04
h	biological half-life of chemical in the body (days)	--	--	--	--	--	See Table 3
IRS _a	incidental sediment ingestion rate-adults (mg/day)	100	100	100	--	200	--
IRS _c	incidental sediment ingestion rate-children (mg/day)	--	--	200	--	--	--
RfD	reference dose (mg/kg-day)	--	--	--	--	--	--
SA _a	exposed skin surface area – adult (cm ²)	1,980/5,700 ^b	1,980/5,700	5,700	3,300	3,300	--
SA _c	exposed skin surface area – child (cm ²)	--	--	2,800	--	--	--
THQ	target hazard quotient	1	1	1	1	1	1
TR	target excess cancer risk	1 x 10 ⁻⁶	1 x 10 ⁻⁶	1 x 10 ⁻⁶	1 x 10 ⁻⁶	1 x 10 ⁻⁶	--

a – 350 days/year fish consumption and 156 days./year sediment contact while fishing

b – beach/in-water sediment

Table 3: Chemical-Specific Values

Chemical	SF (mg/kg-day) ⁻¹	RfD (mg/kg-day)	Infant RfD (mg/kg-day)	h (days)	ABS
Antimony		4.0E-03			
Arsenic	1.5E+00	3.0E-04			0.03
Mercury		1.0E-04			
cPAHs	7.3E+00	3.0E-04			0.13
Bis(2-ethylhexyl)phthalate	1.4E-02	2.0E-02	2.0E-02		0.1
Aldrin	1.7E+01	3.0E-05			0.1
Dieldrin	1.6E+01	5.0E-05	5.0E-05		0.1
Chlordane	3.5E-01	5.0E-04	5.0E-04		0.04
DDx	3.4E-01	5.0E-04	5.0E-04	120	0.03
Hexachlorobenzene	1.6E+00	8.0E-04			0.1
Pentachlorophenol	4.0E-01	5.0E-03			0.25
PCBs	2.0E+00	2.0E-05	3.0E-05	2555	0.14
PDBEs		1.0E-04	1.0E-04	2555	0.14
2,3,7,8-TCDD	1.3E+05	7.0E-10	7.0E-10	2550	0.03

Table 4
Whole Body/Fillet Contaminant Ratios

	Smallmouth Bass	Carp	Black Crappie	Brown Bullhead
Aldrin ^a	5.77	1.36	12	10.46
Chlordane	5.92	1.4	12	10.46
Dieldrin	5.77	1.36	12 ^b	10.46 ^b
DDx ^c	7.17	1.42	6.32	4.06
PCBs	8.02	1.82	5.46	1.56
Total Dioxins/Furans	6.13	1.52	6.13	1.52

a – not measured, based on dieldrin
b – not measured, based on chlordane
c – average of DDD, DDE, and DDT

Table 1
Risk-Based Preliminary Remediation Goals In Tissue

		PRGs (µg/kg fish tissue) Consumption Rate = 142 g/day					
		Cancer	Noncancer		Infant	PRG	Basis ^a
Arsenic		6.7.E-01	7.9.E+01	6.7.E-01		6.7.E-01	ca
Aldrin		5.9.E-02	7.9.E+00	5.9.E-02		5.9.E-02	ca
Dieldrin		6.3.E-02	1.3.E+01	6.3.E-02		6.3.E-02	ca
Chlordane		2.9.E+00	1.3.E+02	2.9.E+00		2.9.E+00	ca
DDx		3.0.E+00	1.3.E+02	3.0.E+00	9.4E+01	3.0.E+00	ca
Hexachlorobenzene		6.3.E-01	2.1.E+02	6.3.E-01		6.3.E-01	ca
cPAHs		4.6.E-02	7.9.E+01	4.6.E-02			ca
PCBs		5.0.E-01	5.2.E+00	5.0.E-01	2.7E-01	2.7.E-01	infant
TCDD		7.7.E-06	1.8.E-04	7.7.E-06	6.2E-06	6.2.E-06	infant
PDBEs			2.6.E+01	2.6.E+01	8.9E-01	8.9.E-01	infant